

CLAIMS

What is claimed is:

1. A disk drive reducing noise, comprising:
a disk tray sliding in and out of the disk drive and on which a disk is placed;
a disk driving portion rotating the disk at a predetermined speed;
a disk chucking apparatus holding the disk on the disk tray;
a data recording/reproducing unit recording data on the disk or reproducing data from the disk; and
an air guide plate installed between an upper surface of the disk tray and an upper cover plate of the disk drive, parallel to the disk tray, and separating an air flow area, the air flow above the disk generated by rotation of the disk being divided into turbulence under the air guide plate and turbulence above the air guide plate.
2. The disk drive as claimed in claim 1, wherein the air guide plate comprises an end portion having a wedge shape that is inclined in a direction in which the air flow above the disk proceeds to move the air flow above the disk up along the air guide plate.
3. The disk drive as claimed in claim 2, wherein the disk drive further comprises a first guide installed on the air guide plate, perpendicular to an upper surface of the air guide plate, along an edge of the air guide plate to rotate the air flowing up along the air guide plate in a same direction as a direction in which the disk rotates.
4. The disk drive as claimed in claim 3, wherein the disk drive further comprises a second guide installed on the air guide plate parallel to the first guide, separated a predetermined distance from the first guide, and perpendicular to the upper surface of the air guide plate, to divide a passing route of the air flow into two or more routes and rotate the air flowing up along the air guide plate in the same direction as the direction in which the disk rotates.
5. The disk drive as claimed in claim 4, further comprising a guide vein installed on the air guide plate to rotate the air flowing up along the air guide plate in the same direction as the direction in which the disk rotates.

6. The disk drive as claimed in claim 2, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

7. The disk drive as claimed in claim 6, wherein the air flow control unit comprises a mesh screen installed on the air guide plate having a screen structure to attenuate turbulence flowing above the air guide plate in an axial direction and a honeycomb structure to attenuate turbulence in a lateral direction.

8. The disk drive as claimed in claim 1, wherein a through hole is formed at a central portion of the air guide plate through which the disk chucking apparatus is installed.

9. The disk drive as claimed in claim 3, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

10. The disk drive as claimed in claim 4, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

11. The disk drive as claimed in claim 5, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

12. A disk drive, comprising:

a disk tray receiving a disk that is rotated, producing turbulence having a turbulence area above the rotating disk;

an upper cover plate covering the disk drive; and

an air guide plate placed between the disk tray and the upper cover plate to separate air flow above the rotating disk into turbulence under the air guide plate and turbulence above the air guide plate, the turbulence above the air guide plate being unaffected by the rotating disk, and the turbulence area under the air guide plate being reduced to reduce the turbulence above the rotating disk.

13. The disk drive as claimed in claim 12, wherein the air guide plate comprises an end portion having a wedge shape that is inclined in a direction of the air flow to move the air flow above the disk up along the air guide plate, reducing a perturbation portion of the turbulence above the air guide plate.

14. The disk drive as claimed in claim 13, wherein the disk drive further comprises a first guide installed on the air guide plate along an edge of the air guide plate to rotate the air flowing up along the air guide plate in a same direction as a direction in which the disk rotates, reducing turbulence at a front edge of the disk drive.

15. The disk drive as claimed in claim 14, wherein the disk drive further comprises a second guide installed on the air guide plate, parallel to the first guide and separated a predetermined distance from the first guide, to divide a passing route of the air flow into two or more routes and rotate the air flowing up along the air guide plate in the same direction as the disk rotation direction.

16. The disk drive as claimed in claim 15, wherein the disk drive comprises a plurality of second guides on the air guide plate to reduce perturbation due to a friction force.

17. The disk drive as claimed in claim 15, further comprising a guide vein installed on the air guide plate to rotate the air flow moving up along the air guide plate in the same direction as the disk rotation direction, reducing turbulence generated above the air guide plate where a direction of the air flow changes.

18. The disk drive as claimed in claim 13, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

19. The disk drive as claimed in claim 11, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

20. The disk drive as claimed in claim 12, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

21. The disk drive as claimed in claim 14, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

22. The disk drive as claimed in claim 18, wherein the air flow control unit comprises a mesh screen installed on the air guide plate having a screen structure to attenuate turbulence flowing above the air guide plate in an axial direction and a honeycomb structure to attenuate turbulence in a lateral direction.

23. A noise reducing apparatus for a disk drive, the disk drive having an upper cover plate covering the disk drive and a disk tray receiving a disk that is rotated, the rotating disk producing turbulence having a turbulence area above the rotating disk, the noise reducing apparatus comprising:

- an air guide plate placed between the disk tray and the upper cover plate to separate air flow above the rotating disk into turbulence under the air guide plate and turbulence above the air guide plate, the turbulence above the air guide plate being unaffected by the rotating disk, and the turbulence area under the air guide plate being reduced to reduce the turbulence above the rotating disk thereby reducing noise of the disk drive;

- an end portion of the air guide plate having a wedge shape that is inclined in a direction of the air flow to move the air flow above the disk up along the air guide plate, reducing a perturbation portion of the turbulence above the air guide plate;

- a first guide installed on the air guide plate along an edge of the air guide plate to rotate the air flowing up along the air guide plate in a same direction as a direction in which the disk rotates, reducing turbulence at a front edge of the disk drive;

- a second guide installed on the air guide plate, parallel to the first guide and separated a predetermined distance from the first guide, to divide a passing route of the air flow into two or more routes and rotate the air flowing up along the air guide plate in the same direction as the disk rotation direction;

a guide vein installed on the air guide plate to rotate the air flow moving up along the air guide plate in the same direction as the disk rotation direction, reducing turbulence generated above the air guide plate where a direction of the air flow changes; and

a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

24. The disk drive as claimed in claim 23, wherein the disk drive further comprises a plurality of second guides on the air guide plate to reduce perturbation due to a friction force.

25. The disk drive as claimed in claim 23, wherein the air flow control unit comprises a mesh screen installed on the air guide plate having a screen structure to attenuate turbulence flowing above the air guide plate in an axial direction and a honeycomb structure to attenuate turbulence in a lateral direction.

26. A noise reducing apparatus for a disk drive, the disk drive having an upper cover plate covering the disk drive and a disk tray receiving a disk that is rotated, the rotating disk producing turbulence having a turbulence area above the rotating disk, the noise reducing apparatus comprising:

an air guide plate placed between the disk tray and the upper cover plate to separate air flow above the rotating disk into turbulence under the air guide plate and turbulence above the air guide plate, the turbulence above the air guide plate being unaffected by the rotating disk, and the turbulence area under the air guide plate being reduced to reduce the turbulence above the rotating disk thereby reducing noise of the disk drive; and

an end portion of the air guide plate having a wedge shape that is inclined in a direction of the air flow to move the air flow above the disk up along the air guide plate, reducing a perturbation portion of the turbulence above the air guide plate.

27. The disk drive as claimed in claim 26, wherein the disk drive further comprises a first guide installed on the air guide plate along an edge of the air guide plate to rotate the air flowing up along the air guide plate in a same direction as a direction in which the disk rotates, reducing turbulence at a front edge of the disk drive.

28. The disk drive as claimed in claim 27, wherein the disk drive further comprises a second guide installed on the air guide plate, parallel to the first guide and separated a predetermined distance from the first guide, to divide a passing route of the air flow into two or more routes and rotate the air flowing up along the air guide plate in the same direction as the disk rotation direction.

29. The disk drive as claimed in claim 28, wherein the disk drive further comprises a plurality of second guides on the air guide plate to reduce perturbation due to a friction force.

30. The disk drive as claimed in claim 28, further comprising a guide vein installed on the air guide plate to rotate the air flow moving up along the air guide plate in the same direction as the disk rotation direction, reducing turbulence generated above the air guide plate where a direction of the air flow changes.

31. The disk drive as claimed in claim 26, further comprising a porous air flow control unit installed on the air guide plate to attenuate a strength and a perturbation component of the turbulence flowing above the air guide plate.

32. The disk drive as claimed in claim 31, wherein the air flow control unit comprises a mesh screen installed on the air guide plate having a screen structure to attenuate turbulence flowing above the air guide plate in an axial direction and a honeycomb structure to attenuate turbulence in a lateral direction, the mesh screen reducing noise and turbulence by changing an anisotropic strong turbulence to an isotropic weak turbulence.